

DOCUMENT RESUME

ED 052 376

VT 013 610

AUTHOR Spaziani, Richard L.; Courtney, E. Wayne
TITLE The Application of Bloom's Cognitive Taxonomy to Selected Professional Education Competencies.
INSTITUTION Oregon State Univ., Corvallis. Div. of Vocational, Adult, and Community Coll. Education.
PUB DATE Jul 71
NOTE 63p.
EDRS PRICE EDRS Price MF-\$0.65 HC-\$3.29
DESCRIPTORS *Ability Identification, *Cognitive Ability, Community Colleges, Comparative Analysis, Correlation, Factor Analysis, Rating Scales, Secondary Schools, Taxonomy, *Teacher Attitudes, *Teacher Qualifications, *Vocational Education Teachers
IDENTIFIERS Blooms Taxonomy

ABSTRACT

The central problem of this study was to determine the hierachial levels of common professional education competencies needed by community college and secondary school vocational instructors. A survey-type questionnaire was developed using a six-point ordinal scale corresponding to the major headings of Bloom's cognitive taxonomy. The population consisted of selected vocational education instructors from Oregon's community colleges and secondary schools. The results were analyzed using the Q-Mode and R-Mode factor analysis techniques. It was concluded that 57 of the 99 professional competencies could be classified as having high levels of correlation and could be grouped into meaningful competency clusters typified by the study's sample population. The data indicated vocational-technical educators resembled one another with regard to the hierachial values assigned to the professional education competencies. (GER)

ED052376

**The Application of Bloom's Cognitive
Taxonomy to Selected Professional
Education Competencies**



Technical Report

**Division of Vocational, Adult, and
Community College Education
Oregon State University
Corvallis, Oregon**

July, 1971

VTO13620

ED052376

**U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION**
THIS DOCUMENT HAS BEEN PRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL POSITION OR POLICY.

The Application of Bloom's Cognitive Taxonomy to Selected Professional Education Competencies

by

**Richard L. Spaziani
and
E. Wayne Courtney**

July, 1971

**Division of Vocational, Adult, and Community
College Education
Oregon State University, Corvallis, Oregon 97331**

Henry A. Ten Pas, Director

Table of Contents

	Page
Statement of the Problem	1
Related Methodological Studies	2
The Instrument	4
The Dependent Variable	5
Selection of the Sample	5
The Statistical Design	8
The Analysis	10
Results of Factor Analysis	10
Q-Mode Analysis	11
R-Mode Analysis	11
Factor I Instructional Organization	12
Factor II Instructional Process	13
Factor III Professional Image	13
Factor IV Preparation for Instruction	28
Factor V Extracurricular Activities	28
Quantile Distribution of Domain Levels (Medians)	28
Conclusions	35
Implications	36
Selected References	38

Page

Appendices

Appendix A Instructor Questionnaire	45
Appendix B Results of Chi-Square Analysis Using the Median Test	53
Appendix C Coding of Data Cards	55
Appendix D Q-Mode Data Control Cards	56
Appendix E R-Mode Data Control Cards	57
Appendix F Results of Q-Mode Analysis	58
Appendix G Oregon Community Colleges Participating in the Study	59
Appendix H Oregon Secondary Schools Participating in the Study	60

List of Tables

Table

1 Factor I Instructional Organization	14
2 Factor II Instructional Process	21
3 Factor III Professional Image	25
4 Factor IV Preparation for Instruction	30
5 Factor V Extracurricular Activities	33
6 Quantile Distribution of Domain Levels (Median) based upon combined frequency of responses	34

List of Figures

Figure

1 Schools participating in the Study	6
2 Percentage of Common Factor Variance for the R-Mode Analysis	12

Acknowledgement

A sincere "thank you" is extended
to all of the school administrators
and vocational educators who made
this study possible.

Statement of the Problem

The studies of Gunderson (1971), Lindahl (1971), and Miller (1971) re-emphasized the emerging concepts of the Division of Vocational, Adult and Community College Education for the preparation of vocational educators at all levels, and were designed to facilitate the process of developing vocational teacher preparation curricula. The accent of these studies reflect the need for flexibility in teacher education programs proposed by Dillon (1969), as well as the necessity to identify the unique aspects of each area of vocational education, and what is common to two or more areas.

As distinctive as these steps are to the identification of common professional education competencies, the importance of developing a hierarchical framework within these tasks cannot be minimized. The function and relationship of the hierarchical structure in educational behavior is explained by Krathwohl (1965) as follows:

The taxonomic approach makes its greatest contribution in forcing the instructor to spell out his instructional goals in terms of overt behavior . . . Thus, the instructor knows what kinds of behavior (levels) he is trying to develop in the classroom (p. 84).

Acknowledging the necessity of restructuring its teacher education programs to parallel evolving national and state needs, the Division of Vocational, Adult and Community College, Oregon State University, has described an innovative approach to the problems of vocational teacher curriculum development in its Proposal for Change (1970). The proposal stresses the need to identify common elements of required behavioral competencies, and argues:

Oregon State University should take the leadership in building an empirically based training program which is validly related to those tasks with which the beginning teacher will find himself confronted in the field (p.4).

- To assist in the structuring of an empirically-based vocational teacher preparatory program, the central problem of this study was to determine the hierarchical levels of common professional education competencies needed by community college and secondary school vocational instructors.

Related Methodological Studies

The use of factor analysis as an analytical tool is common practice in the examination of personnel tasks and employee attitude surveys, and has been used extensively in the scientific fields where variations of individual differences must be identified. As computer programs become readily available, says Kirchner and Lucas (1970), the use of factor analysis as a technique for the analysis of interrelationships will also increase. Kirchner points out that factor analysis simplifies confusing data by clustering those items that go together, and from such clustering, one can determine the basic factors present in the study.

Essentially, there are minimal differences in definition and use of factor analysis as described by Cattell (1952), Good and Scales (1954), Harman (1967), and Thurston (1947), who agree that structurally it is a rigid arithmetic tool.

When development of curricular structure is considered from the viewpoint of task performance, the use of factor analysis to study professional competencies and behavioral objectives is not unusual. The substantiation of factor analysis in vocational education curriculum development has been evidenced by several national studies.

Halfin and Courtney (1970) identified the common core of curricular experiences for the training of technical teachers. The study utilized a Likert-type instrument, and was administered to 150 teachers randomly

selected from each of five vocational disciplines. Ten states were used in the study. The data gathered were processed by factor analysis which rotated the 130 test items orthogonally. Six interpretable factors were identified for use in curriculum development. The major interest of this study was directed toward determining the common training requirements of secondary school level vocational instructors. Tuckman's (1970) SOOPE study utilized factor analysis to test a three-dimensional domain-process-object taxonomy to classify educationally-relevant behavior.

The use of a check list to gather task data from employees in the field has been found to be a valid method in task analysis, and has been used by the previously mentioned studies. Courtney (1967) developed a device used for establishing the core of professional knowledge and the abilities required in training programs for vocational education teachers. The knowledge and skills described in the research instrument included items selected from a review of the literature, and utilized a consulting group of specialists from business, industry, and vocational education. A similar technique was used by Crawford (1971), Gunderson (1971), Lindahl (1971), and Miller (1971).

To identify clusters of knowledge and competencies needed by merchandising employees, Ertel (1966) administered a checklist to employees to obtain facts about the major types of tasks required. Ertel's method may be thought of as unique in that task lists were not submitted to employees in a randomly selected group of stores, but only to those businesses considered as modern "leading edge" firms where the nature of the work performed was most likely to represent the prevailing direction for the foreseeable future.

Sjorgen (1967) used a three-day training period to familiarize

respondents with the instrument's procedures, in a study to identify common behavioral factors as a basis for pre-entry preparation of workers for gainful employment. The instrument was personally administered to respondents at their homes or places of business. While completing the questionnaire, each respondent had a copy of the scale descriptions for periodic reference.

Use of the cognitive taxonomy is not necessarily restricted to or functional only for curriculum improvement in vocational education. Kirsner (1968) demonstrated how specific behavioral objectives formulated within the hierarchy of the major levels and sub-levels of Bloom's taxonomy of educational objectives can easily be applied to teacher preparation in educational psychology programs.

The Instrument

The instrument used in the study was a survey-type questionnaire designed primarily for mailing, but modified for personal administration to selected vocational education competencies in combination with a six-point ordinal scale corresponding to the major headings of Bloom's (1956) cognitive taxonomy. The scale permitted each respondent to judgmentally score the taxonomic level considered necessary for adequate behavior required by the responsibilities of his work. Essentially, the instrument was a slight modification of the one used by Gunderson (1971), Lindahl (1971), and Miller (1971) in their four-Western-state study to determine the degree of task proficiencies required for vocational educators at the community college level.¹

¹ See Appendix A for a copy of the instrument.

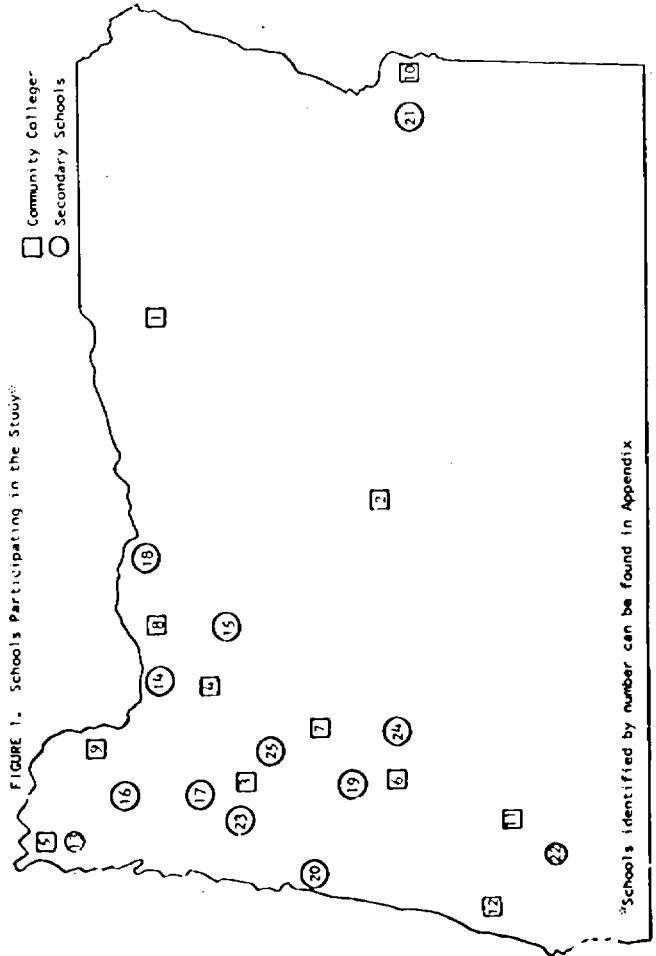
The Dependent Variable

The dependent variable in the study was a score assigned by respondents on a six-point ordinal scale to indicate the hierarchical level they considered necessary in their work for each of the 99 professional education competencies. In a personal interview setting, respondents were asked to indicate professional judgments based upon their teaching experience. Hierarchical values and major heading designations corresponded exactly to those presented in Bloom's taxonomy: (1) Knowledge, (2) Comprehension, (3) Application, (4) Analysis, (5) Synthesis, and (6) Evaluation.

Selection of the Sample

The population used in the study consisted of selected effective vocational education instructors from Oregon's community colleges and secondary schools. Four instructors were recommended by the Deans of Instruction or Directors of Vocational Education at each of the institutions; four instructors were recommended from each of the 13 randomly selected secondary schools by the building principals. Not all recommended secondary school respondents were able to take part in the study, but the total sample used in the study consisted of 94 respondents who represented vocational-technical instructors in Oregon's community colleges and secondary schools.

Three criteria were considered for the selection of the secondary schools sampled. First, the school had to offer diverse vocational education programs; second, the vocational education staff had to be of sufficient size to permit the building principal a reasonable opportunity to select one or more effective instructors as respondents. Thirdly, secondary schools meeting the first two criteria had to be broadly



distributed within the state so as to offer each geographical area and corresponding populations an equal opportunity for participation in the study. The primary population meeting these criteria consisted of 138 secondary schools with a minimum student population of 200 or more. Secondary schools used in the study were randomly selected.¹ The total number of full-time vocational-technical instructors employed in the state at the time of the study was approximately 944.

Effective teachers were considered as those judged as being effective in their work by their major supervisors. The criteria used for selection of the instructors were identified by Cosgrove² as specific factors of teacher effectiveness, and are as follows:

- A. Knowledge and organization of subject matter.
- B. Adequacy and relations with students in class.
- C. Adequacy of plans and procedures in class.
- D. Enthusiasm in working with students.

An analysis of the Q-Mode data generated by the studies of Gunderson (1971), Lindahl (1971) and Miller (1971) indicated that no major differences existed among the responses of the community college instructors examined in California, Colorado, Oregon, and Washington. Therefore, it was assumed a valid approach to confine the determination of the hierarchical levels of the 99 professional competencies to Oregon's 12 community colleges. The results of Cotrell's (1970) study, in which few differences were found between secondary school and postsecondary vocational instructors in 19 states and 7 occupational service areas, further suggested that the same assumption could be applied to

¹A Table of Random Numbers was used to select the sample.

²See Gage (1963) p.141.

Oregon's secondary schools.

The Statistical Design

The major focus of this study was to determine the hierarchical structure of common professional education competencies needed by community college and secondary school vocational education instructors. Research by Gunderson, Lindahl, and Miller, and that by Crawford (1969), Cotrell (1970), and Halfin and Courtney (1970), provided the foundation for the general design of this study which includes the following elements:

- A. The population for the study consisted of full-time vocational-technical instructors from Oregon's community college and secondary schools. A total sample of 94 vocational instructors was used in the study.
- B. Based on their teaching experiences respondents were asked to react to each of the 99 competencies by indicating on a six-point original scale the hierarchical level they considered to be necessary in the performance of their responsibilities as teachers.
- C. Clusters of competencies were generated through the use of factor analytic Q-Mode and R-Mode. The modes took on the following characteristics for the study.
 1. The Q-Mode analysis essentially involved the ordering of respondents according to the competencies included in the study. Thus, this form of analysis provides a measure of commonality among the various vocational instructors comprising the sample.

2. The R-Mode is one which orders competencies according to the respondents included in the study, and provides for a clustering of competencies according to the hierarchical structure of the responses. Hence, the 99 dependent variables studied were grouped hierarchically through this analysis.
3. Competencies with rotated factor loading of $\pm .450$ or larger were considered for inclusion of the item in a factor or cluster.¹
- D. A median test² was conducted on the data to contrast the differences between the responses of the community college and secondary school vocational instructors. The median test provides information regarding whether it is likely that two groups have been drawn from populations with the same medians.

The critical region for the null hypothesis level was set at $\alpha = .05$ with the degrees of freedom equal to 1. The Chi-square table was used in determining the theoretical values for the test of significance. Since $N > 50$ and no cell frequency was less than 5, χ^2 corrected for continuity was used to test the null hypothesis.

¹See Fruchter (1954). Factor loadings of .20 or less are usually regarded as insignificant, loadings of .20 to .30 as low; .30 to .50 as moderate; .50 to .70 and above as high.

²See Siegel (1956) p.111

The Analysis

The Median Test was used to conduct 99 two-way classification analyses in the study. In each instance, responses from 12 Oregon community colleges and 13 secondary schools were tested to determine whether the medians of the two independent groups differed significantly, and whether they were drawn from populations with the same median. The testing of the combined median, which cast the data into a 2×2 matrix showed that except in two cases,¹ the community colleges and secondary schools were alike in their responses. The results of these tests are found in Appendix H.

Each of the 99 competencies was ranked. Rankings were based upon the combined median score for each of the professional competencies. The ten competencies with the highest median scores are contained in Table 6. The ten competencies with the lowest median scores are contained in Table 7. Median score ranks of all competencies are included in Tables 1 through 5.

Results of Factor Analysis

Factor analysis was used for the purpose of determining the specific factors which were present among the 99 competencies included in the study. The procedures used permitted the identification of groups or clusters of competencies in which, according to generated factor loadings, there existed a high degree of correlation with the extracted factors. Only those competencies with factor loadings of $\pm .450$ or

¹The two cases rejected were competencies 15 and 19.

greater were included in a factor. The results of the factor analysis were generated through the Q-Mode and R-Mode techniques. A description of the computer control data can be found in Appendix D and Appendix E.

Q-Mode Analysis

Q-Mode¹ technique involves the ordering of respondents according to the competencies in the study, and provides a measure of commonality among the numerous vocational-technical areas represented by the respondents. Results of the four-factor Q-Mode solution indicated that, in all instances, factor loadings were $\pm .91$ or higher. The tabulated results of the Q-Mode technique can be found in Appendix L.

R-Mode Analysis

Generally, the R-Mode technique was considered as one of the most important procedures in the study. The literature indicates that a great majority of factor studies have used the R-Mode technique. Primarily, the R-Mode clusters competencies according to the respondents in the study. The data were factor-analyzed three times using six-, five-, and four-factor solutions. Figure 2 lists the common factor variance accounted for in the twelve factor solution.

Factors generated by the R-Mode analysis resulted in factor loadings of $\pm .450$ or higher. Negative loadings were considered in absolute terms. The five-factor and four-factor solutions resulted in the same total number of factor loadings in excess of $\pm .450$; however, the loadings in the five-factor solution were more evenly distributed among the factors. Therefore, the five-factor solution was considered to best represent the data. Results of the R-Mode analysis using the five-factor solution appear in Tables 1 to 5. Each table is illustrative of a factor, and

¹See Appendix D for control card data.

contains a separate listing of spurious competencies, which are defined as those highest under one factor but with factor loadings of less than $\pm .450$. Factors and corresponding subfactor designations were assigned after the data were analyzed. The names of the factors were judgmentally assigned, and are assumed to be indicative of the general nature of the competencies which loaded under each factor. All significant loadings were clearly defined under one of the five generated factors. There was no factor overlap among the competencies which loaded $\pm .450$ or higher.

FIGURE 2. Percentage of common factor variance for the R-Mode analysis

Factor	Percentage	Cumulative percentage
1	18.62441	18.62441
2	6.49158	25.11599
3	5.92563	31.04161
4	3.74408	34.78570
5	3.20282	37.98852
6	2.99807	40.98658
7	2.88956	43.87614
8	2.67003	46.54617
9	2.56542	49.11159
10	2.33793	51.46953
11	2.20393	53.67346
12	2.17584	55.84929

Factor 1. Instructional Organization

A total of 24 competencies loaded under Factor 1 with a factor loading of $-.478$ or higher. Three subfactors were clearly identifiable within the primary factor. The first subfactor, Program Development, contained six competencies. Four competencies loaded under the sub-factor, Program Operation. Program Coordination, the third subfactor, contained two competencies. Factor 1 was the only factor with identifiable subfactors, and contained the greatest number of competencies.

Factor I generally contained some of the lowest median rankings. Table 1 contains the specific competencies, factor loadings, response breakdown, median scores, and median ranks which were included in Factor I. Table 6 locates the Quantile Distribution¹ of each Domain Level (median) found in Factor I.

Factor II. Instructional Process

A total of eleven competencies with factor loadings of -.450 or higher were generated for Factor II. Table 2 contains the specific competencies and other data included in Factor III. Table 6 locates the Quantile Distribution of each Domain Level (median) found in Factor II.

Factor III. Professional Image

Eleven competencies clustered under this factor with factor loadings of .456 and above. Factor III generally contained some of the lowest median rankings. Table 3 describes the specific competencies and other data included in Factor III. Table 6 locates the Quantile Distribution of each Domain Level (median) found in Factor III.

¹See page for an explanation of the Quantile Distribution.

TABLE 1. Factor 1 - Instructional Organization

		Responses						
		Competencies						
		Factor loading	Factor	Knowledge	Comprehension	Application	Evaluation	
Program Development	8. interpret the innovative provisions of the Vocational Act as amended in 1968	.-607	cc 16	13	12	2	2	1.574
Program Development	12. interpret the goals of general education	.-523	ss 11	14	7	6	2	98
Program Development	16. interpret the history of vocational education	.-523	cc 20	16	7	2	1	97
Program Development	18. interpret state certification requirements for instructors	.-536	ss 12	20	5	1	4	5
Program Development	19. assist in the development of the total (community college/secondary school) program	-.602	cc 5	4	8	14	6	10
Program Development	23. interpret the state specifications and requirements for vocational facilities.	-.614	cc 10	8	15	4	7	3
			ss 4	7	14	8	3	11
								3.120
								77

		Responses					
		Knowledge					
		Comprehension					
Subfactor	Number	Factor Loading	1 Knowledge	2 Comprehension	3 Application	4 Analysis	5 Synthesis
Program Development	25. Interpret the philosophy of the comprehensive (community college/secondary school)	-.633	cc .5	9 13	9 3	8	3.220
Program Development	30. Interpret the philosophy of the (community college/secondary school) in providing vocational programs for the student	-.523	cc .1	6 12	10 8	10	5.150
Program Operation	40. Provide special training or assistance to disadvantaged and handicapped students	-.481	cc .4	7 11	5 7	9	3.167
Program Development	41. Use the State Plan for Vocational Education in securing reimbursement for vocational programs	-.603	cc .15	9 13	4 3	3	2.574
Program Development	43. Interpret the history of education	+.554	cc .22	12 9	1 2	1	-
			ss .23	15 6	2	-	1.543
							99
	45. Formulate your own educational philosophy	-.515	cc .2	-	5 8	6 26	5.540
			ss .3	3 8	3 7	23	20

Table 1. (Continued)

TABLE I. (Continued)

Sub-factor Indicator	Competencies	Responses						Domain level (Mdn) Ranking	
		1	2	3	4	5	6		
Program Development	46. utilize state guidelines for curriculum planning	-.597	cc	2	11	11	12	3	8
Program Coordination	48. identify the similarities and differences between the goals of general and vocational education	-.648	cc	5	4	8	11	5	15
	52. interpret the objectives of vocational education to others	-.530	cc	1	6	11	13	7	9
Program Coordination	55. conduct community surveys to improve instruction or plan programs	-.596	cc	8	8	8	5	10	3.425
	63. distinguish between two or more educational philosophies	-.518	cc	6	6	10	19	2	4
Program Operation	71. use counseling techniques to help students solve personal and social problems	-.478	cc	7	8	17	9	6	7
		ss	4	5	15	5	3	14	3.409
									73

TABLE I. (Continued)

Subject or Competencies	Factor Loadings	Responses						Domain level (High) Evaluation Synthesis	Median Ranking
		1	2	3	4	5	6		
Program Development	83. interpret the socio-economic class structure of the local community in relation to students enrolled in vocational programs.	.616	cc 9 ss 1	8 10 9 11	7 7 9 6	6 11 9 6	7 7 11 11	3.452 3.452	72
Program Operation	84. identify acceptable community social behaviors for instructors.	-.485	cc 7 ss 7	10 12 11 12	11 11 12 11	2 2 - -	5 6 - -	3.042 3.042	80
Program Operation	86. identify local community power structures and pressure groups.	-.505	cc 13 ss 7	7 12 10 4	12 14 14 4	3 6 4 8	3 6 7 7	3.000 3.000	83.5
Program Operation	89. interpret school policies	-.509	cc 3 ss 4	9 15 11 9	2 8 9 8	4 7 3 12	7 7 3 12	3.333 3.333	75
Program Operation	90. provide programs for the student with special needs.	-.500	cc 2 ss 1	6 1 1 12	7 8 8 8	17 17 17 17	4.63 4.63	39	
Program Operation	92. write articles for news releases	-.627	cc 15 ss 7	12 11 7 18	5 6 6 6	3 1 3 6	2.707 2.707	92	

TABLE 1. (Continued)

Subsector Competency	Competencies	Factor Loading	Responses					
			Appreciation of diversity	Cross-cultural comprehension	Analytical synthesis	Evaluation of evidence	Domain level	Median Ranking
<i>Spurious Competencies</i>								
1	Assist (com col/sec sch) administrators initiate and maintain vocational programs.	.419	cc	-	7	6	25	12.5
2	Interpret the provisions of instructor tenure laws.	-.413	cc	14	16	3	28	5.613
14	Participate in the supervision of non-vocational extracurricular activities	-.370	ss	8	18	6	2	2.688
17	Relate technological advances to laboratory and classroom instruction	-.304	cc	-	1	10	9	24
20	Interpret state certification requirements for instructors	-.169	cc	1	3	7	2	23
			ss	1	-	5	8	30

TABLE 1. (Continued)

Subsector Competency	Competencies	Factor loading	Responses					
			Knowledge	Appreciation	Cognitive function	Synthesis	Analyisis	Evaluation
22 Secure on-the-job training positions for students	-,.396	cc	2	4	10	7	15	4,206
	ss	4	5	10	10	2	16	50
34 Interpret the legal liabilities of a teacher	-.313	cc	7	17	9	10	2	2
	ss	5	13	16	7	2	4	3,100
36 Relate to students from different socio-economic backgrounds	-.379	cc	1	1	12	9	6	18
	ss	-	9	9	13	5	11	53
51 Relate the vocational program to other instructional programs	-.409	cc	1	6	11	10	10	9
	ss	-	2	7	11	8	19	4,452
65 Use a student centered teaching style	-.431	cc	1	-	5	9	7	25
	ss	-	1	12	7	9	18	5,250
66 Identify students in need of counseling or guidance	-.391	cc	1	-	1	16	8	21
	ss	2	3	6	13	4	19	4,619
								40

TABLE 1. (Continued)

Subsector Competencies	Number Responses	Factor loading	Responses					
			1 Comprehension	2 Application	3 Analysis	4 Synthesis	5 Evaluation	Median (Md.)
73 Aid students in entering educational or occupational training programs beyond the (comm col/sec sch) level	-.439	cc 2	4	12	7	9	13	4,312 47
77 Lead a conference	-.434	ss 1	3	12	9	5	17	
94 Conduct follow-up studies for purposes of determining effectiveness of instruction	-.394	cc -	1	5	6	6	19	5,071 30
96 Articulate your instructional program with other educational institutions or agencies:	-.368	cc 1	10	9	12	6	9	3,552 67
98 Screen and select students for your program	-.442	cc 1;	7	3	8	4	14	3,767 61
99 Coordinate and supervise cooperative work experience programs.	-.411	cc 2	4	10	11	5	15	4,233 46

TABLE 2. Factor II - Instructional Process

Competency number	Competencies	Factor loading	Responses						
			Knowledge	Comprehension	Application	Evaluation	Analysis	Synthesis	Creation
13	provide practical shop or laboratory experiences to enhance classroom learning	-.579	cc	-	2	3	8	34	5.956
33	motivate students in the classroom, shop or laboratory	-.597	cc	-	1	4	8	34	
37	utilize individualized instruction materials and techniques	-.510	ss	-	7	3	5	32	5.819
49	develop classroom instruction based upon the individual needs of the learner	-.546	cc	-	2	7	9	29	5.729
50	provide appropriate practice for development of basic skills	-.476	cc	-	3	3	7	10	24
56	use the information contained in professional journals for personal improvement of instruction	-.510	cc	-	2	15	8	6	16
		ss	2	21	10	2	10	3.611	64

TABLE 2. (Continued)

Competency number	Competencies	Factor loading	Responses					
			Knowledge	Cognitive processing	Application	Technology	Communication	Domain level (Mdn)
59	teach at the student's level and rate of learning	-.595	cc -	-	2	8	4	33
			ss -	-	3	5	8	31
61	maintain student attention during classroom presentations or demonstrations	-.560	cc -	-	9	7	8	23
			ss -	-	13	6	9	18
78	develop student learning activities to facilitate instruction	-.566	cc -	-	4	11	10	22
			ss -	-	8	5	8	26
81	relate current events associated with your subject matter area to classroom instruction	-.453	cc -	1	11	11	7	17
			ss 2	1	16	8	9	11
93	be stimulating in your work as an instructor	-.468	cc -	-	4	3	9	31
			ss -	-	8	2	14	23
	<u>Spurious statements</u>							
3	Conduct a shop or laboratory demonstration for an individual student	-.443	cc -	1	4	5	9	28
			ss -	-	3	6	8	30
								5.618
								11

TABLE 2. (Continued)

Competency number	Competencies	Factor loading	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation	Domain level (high)	Median ranking
		1	2	3	4	5	6	7		
6	Ask questions during classroom presentations or demonstrations to aid student learning	-.412	cc	-	1	1	8	11	26	5.578
			ss	-	-	1	11	10	25	
9	Select appropriate equipment and supplies for instructional purposes	-.446	cc	-	1	4	8	30	5.809	5
			ss	-	-	1	4	4	38	
10	Arrange and conduct field trips	-.187	cc	1	2	11	11	2	20	5.250
			rs	1	1	6	8	6	25	26.5
27	Revise courses in accordance with current occupational trends	-.236	cc	-	2	5	11	29	5.519	23
			ss	-	-	3	4	11	29	
39	Interpret your vocational program to others	-.302	cc	-	6	2	13	9	17	5.000
			ss	-	3	5	11	5	27	32
44	Build a display for instructional purposes	-.425	cc	2	7	14	7	6	11	3.929
			ss	1	6	11	7	7	15	57

Table 2. (Continued)

Competency number	Competencies	Factor loading	Responses						Domain level (MdN)	Median Ranking
			Knowledge	Comprehension	Application	Synthesis	Analysis	Evaluation		
47	Draw from personal avocational interests to enrich instruction	.231	cc	-	1	7	11	17	4.868	35
72	Summarize classroom presentations	-.354	cc	+	3	5	12	8	19	4.912
91	Use programmed learning materials	-.353	cc	1	10	11	9	6	10	3.864
97	Interpret safety rules and regulations to students	-.385	cc	3	8	9	7	5	15	4.045

Competency number	Competencies	Factor Loading	Responses								
			1	2	3	4	5	6			
7	adapt your appearance and appeal to acceptable standards for instruction	.527	cc	6	1	21	-	8	11	2.678	94
29	adhere to the code of ethics adopted in your (community college/secondary school)	-.746	ss	5	6	16	3	3	14	3.567	46
42	organize or work with local vocational advisory committee	.474	cc	2	3	8	8	8	18	4.136	55
53	maintain a clean, orderly laboratory or classroom	.604	ss	3	5	9	3	5	22	3.446	69
67	participate in professional organizations related to your subject matter area	.598	cc	2	2	16	8	7	14	3.625	63
70	utilize the services of local and state vocational education agencies	.469	ss	5	7	18	5	1	5	3.118	78

TABLE 3. (Continued)

Competency number	Competencies	Factor loading	Responses					
			Knowledge	Comprehension	Application	Evaluation	Domain level	Median (Mdn)
75	Maintain discipline in the classroom, shop or laboratory	.614	cc	-	3	17	7	18
76	participate in outside trade, business, or professional organizations related to your subject matter area	.545	cc	2	3	15	5	17
79	communicate your ideas or point of view to other instructors or administrators	.456	ss	3	7	19	9	6
82	inform students of the nature and requirements of specific occupations	.640	cc	2	3	7	5	12
85	work cooperatively with people in the community	.572	cc	2	2	13	9	13
<u>Service Competencies</u>								
4	involve yourself in civic community activities not directly related to the school	.410	cc	7	7	18	5	5
			ss	3	14	21	5	3
							7.910	86

TABLE 3. (Continued)

Competency number	Competencies	Factor loading	Responses						Median level (Mdn) ranking
			Knowledge	Comprehension	Application	Synthesis	Analyisis	Critical evaluation	
15	Aid the student in obtaining job placement after training	.417	cc	2	4	6	7	10	18
21	Locate available standardized tests	.226	ss	12	9	13	5	3	5
28	Maintain student performance or progress records	.412	cc	2	12	11	4	16	4,382
64	Maintain necessary report forms required by state or federal agencies	.401	cc	13	7	11	11	3	2
88	Make use of available guidance and counseling services within the (community college/secondary school)	.351	ss	2	5	20	9	5	6

Factor IV. Preparation for Instruction

Eleven competencies were clustered under this factor with loadings of .455 and higher. The items listed in this factor pertain directly to instructional preparation and evaluation of instructional results.

Table 4 contains the specific competencies and other data included in Factor IV. Table 8 locates the Quantile Distribution of each Domain Level (median) found in Factor IV.

Factor V. Extracurricular Activities

This factor did not meet the criteria established for the naming of a factor, but is included in order to account for the 99 competencies contained in the study. Two spurious competencies with factor loadings of .371 and .372 are contained in this item. Both are ranked in the lower 10 percent of the median ranking. Table 5 contains the specific competencies and other data included in Factor V. Table 8 locates the Quantile Distribution of each Domain Level (median) found in Factor V.

Quantile Distribution of Domains Levels (Medians)

The quantile distribution represents a useful method of describing a group of observations. A quantile is a concept, and percentiles, deciles, and quartiles are examples of it. A quantile is a point on a number scale which is assumed to underlie a set of observations. The quantile points on this scale are separated into three major quartile units, Q_1 , Q_2 , and Q_3 , which divides the group of observations into four quarters. For example, Q_1 is that point on the number scale such that one-fourth of the observations lie below it; one-half below Q_2 , and three-quarters below Q_3 . For convenience and ease in understanding the relationship of the domain distributions, the combined medians generated

In the median test have been placed in quartile (Q_1 , Q_2 , and Q_3) and percentile (P_1, \dots, P_{99}) units. Thus, the domain levels (medians) of the 99 competencies have been distributed as follows:

$$Q_1 (P_{25}) = 3.220$$

$$Q_2 (P_{50}) = 4.200$$

$$Q_3 (P_{75}) = 5.250$$

Table 8 contains the Quantile Distribution of the Domain Levels (med.) found in the study for the 99 professional competencies.

TABLE 4. Factor IV - Preparation for Instruction

Competency number	Competencies	Factor Loading	Responses					
			Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
11	interpret the goals and objectives of vocational education	.479	cc	2	6	12	8	17
26	develop audio-visual materials for instructional purposes	.559	ss	1	3	4	6	27
31	select textbooks and instructional materials for the classroom, shop or laboratory	.459	cc	-	2	7	3	35
32	develop objective tests to measure achievement	.603	cc	-	3	8	5	31
38	relate the course of study to measurable performance objectives	.694	ss	1	-	2	8	29
53	break down an occupation or job into its component parts for instructional or guidance purposes	.540	cc	1	4	9	11	21
			ss	1	2	7	9	19

TABLE 4. (Continued)

Competency number	Competencies	Factor loading	Responses					
			Domain level (Mdn.)	Median Ranking	Synthesis	Comprehension	Application	Analysis
54	write performance objectives	.777	cc -	2	3	5	7	30
			ss 3	4	4	3	7	26
62	make a daily lesson plan	.455	cc 7	4	12	6	5	13
			ss 9	3	11	7	6	11
68	evaluate the effectiveness of a classroom or laboratory demonstration	.544	cc -	-	3	5	8	31
			ss -	1	6	8	4	28
74	develop performance tests to measure achievement	.621	cc -	-	6	6	9	26
			ss 1	1	4	9	7	25
80	develop subjective tests to measure achievement	.518	cc 2	5	8	8	8	16
			ss 2	6	10	12	5	12
<i>Source: Various Competencies</i>								
5	Promote and teach adult vocational programs	.440	cc 1	5	5	7	8	23
			ss 5	-	11	3	4	24
							5.000	32

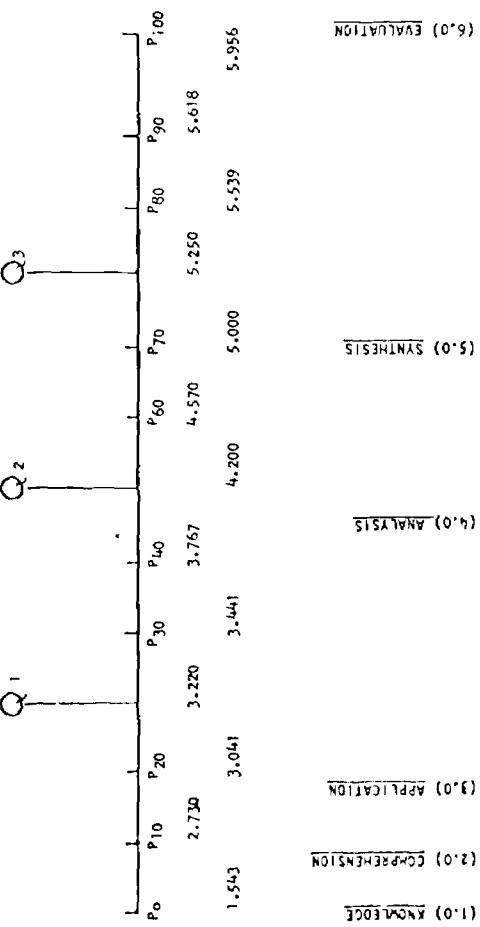
TABLE 4. (Continued)

Competency number	Competencies	Factor loading	Responses					
			Knowledge	Skills	Attitudes	Behaviors	Level	Median
26	Select appropriate audio-visual materials for instructional purposes	.415	cc	-	1	7	6	25
			ss	-	1	6	8	27
57	Assess the validity, reliability, and difficulty of instructor-made tests	.449	cc	-	1	3	9	23
			ss	1	5	6	8	21
60	Utilize written shop, classroom, and laboratory equipment organization, and laboratory equipment organizational plans	.420	cc	2	6	13	14	8
			ss	1	3	22	6	8
69	Use the results of standardized test scores for job placement	.449	cc	10	11	8	3	4
			ss	5	8	3	2	11
95	Evaluate teaching effectiveness by measuring student achievement	.355	cc	-	1	3	9	27
			ss	-	2	11	12	22

TABLE 5. Factor V - Extra-curricular Duties

Competency number	Competencies	Factor loading	Responses						
			Knowledge	Comprehension	Application	Synthesis	Evaluation	Median level (min)	Ranking
36	Direct, advise, or promote student participation in competitive events or youth organizations related to vocational education	.371 .371	cc 2 ss 4	cc 2 ss 5	3 2 13 5	3 2 13 5	4 3 15 5	2.853 87	87
87	Operate duplicating equipment	.372 .372	cc 17 ss 13	cc 18 ss 13	3 21 3 21	1 3 - 3	3 2 7 3	2.730 91	91

TABLE 6. Quantile distributions of domain levels (medians) based upon combined frequency of responses.



Glass and Stanley (1970) p. 33-38.

Conclusions

The determination of the hierarchical levels of 99 professional vocational competencies was the primary question to which the present study was directed. Domain levels were calculated for each of the 99 professional competencies, and distributed as follows in the major classifications of the quantile scale: $Q_1(P_{25}) = 3.220$; $Q_2(P_{50}) = 4.200$; and $Q_3(P_{75}) = 5.250$. For the purpose of developing useful vocational teacher preparation curricula, it was concluded that 57 of the 99 professional competencies could be classified as having high levels of correlation, and could be grouped into four meaningful competency clusters typified by the study's sample population.

Significant differences or independence of the two groups in the study were produced by application of the Median Test. On the basis of the analysis applied in the Median Test, 97 of the 99 null hypotheses were retained. The hierarchical nature of the domain levels precluded the determination of the differences as being interpreted purely to chance.

The conclusion of commonality among the study's sample population was strengthened by strong correlations in the Q-Mode analysis. The data generated indicated vocational-technical educators resembled one another with regard to the hierarchical values assigned to the professional education competencies. The results of studies by Gunderson (1971), Lindahl (1971), and Miller (1971), Halfin and Courtney (1970), and Cotrell (1970) generally tend to support these findings.

The application of the R-Mode technique to data gathered from a variety of vocational educators in the field resulted in the grouping of 57 professional competencies into four primary factors. Therefore, it

may be concluded that factor analysis applied to data with numerous underlying variables is a useful technique for identifying common factors from among the different competencies and professional specialists.

Implications

Based upon the results of this study, the following statements are proposed as having significant implications for vocational pre-service and in-service teacher preparatory programs:

1. The universality of responses shown to exist between community college and secondary school vocational educators indicates that teacher preparatory programs founded upon common professional competencies would meet the majority needs of both educational levels. Therefore, the proliferating of courses to accommodate each level is unnecessary.
2. Since the results of this study indicate a similarity in many functional behaviors within the 99 professional competencies, it may be implied that the educational needs of vocational educators generally are not as complex or diverse as it may have been assumed.
3. The commonality of responses shown to exist among the respondents of this study, and the commonality found in the Western-states studies of Gunderson (1971), Lindahl (1971), and Miller (1971), suggest that the preparation and professional certification of community college and secondary school instructors may be accomplished through regional or reciprocal cooperative

agreements between the states.

4. The results of the study suggest that vocational teacher preparatory programs should place greater emphasis on the individualization of instruction, teaching at individual learning rates, writing of performance objectives, evaluation of instruction, and interpreting the goals and objectives of vocational education.
5. The results of the analysis indicate that emphasis in several areas of professional development need not extend beyond the Applied (1) or Comprehension (2) domain levels.
6. The commonality of agreement reflected by the respondents in this study suggests that vocational teacher preparatory programs be considered in terms of their relevancy to needed performance levels required in the field, as they are described in the cognitive domain.

Selected References

- Bloom, Benjamin S. et al. 1956. *Taxonomy of educational goals, Handbook II: Cognitive domain.* New York, Green and Company. 207 p.
- Cattell, Raymond Bernard. 1952. *Factor analysis: An introduction and manual for the psychologist and social scientist.* New York, Harper. 462.
- Cotrell, C. J. 1970. A paper presented at the 4th annual national vocational-technical teacher education seminar. St. Louis, Missouri. 6 numb. leaves. (Mimeographed)
- Cotrell, C. J., and A. J. Miller. 1969. Design for developing a model curriculum for teacher education. *American Vocational Journal* 44:25-27.
- Courtney, E. Wayne. 1957. The identification and comparison of the common professional training needs and requirements for teachers of vocational education. (Phase I-the instrument). 34 numb.leaves. Office of Education, Bureau of Research, U.S. Department of Health, Education and Welfare, Project Number J-8319. (Educational Resource Information Center no. ED 101 845) (Microfiche)
- _____. 1968. A conceptual basis for developing common curricula in teacher education programs for occupational education. Graduate studies in Education, Number 2, Volume III, Menomonie, Wisconsin, Stout State University. 47 p. (Educational Resources Information Center no. ED 020 028) (Microfiche)
- Courtney, E. Wayne and Harold Halfin. 1969. A factor analysis of the training needs of teachers of occupational education. Madison, Board of Regents of Wisconsin State Universities. 52 p.
- Crawford, Lucy C. 1969. A competency pattern approach to curriculum construction in distributive teacher education. Blacksburg, Virginia Polytechnic Institute. 250 p. Final Report of Project ED-6-E5-044. (Educational Resources Information Center no. ED 032 435) (Microfiche)
- Dillon, Roy D. 1969. Seminar for preparation of professional personnel for vocational-technical education. Final Report. Lincoln, University of Nebraska. 146 p. U.S. Department of Health, Education and Welfare, Office of Education, Bureau of Research Grant No. OEG-0-8-080-358-3594.
- DeFore, Paul W. 1966. Structure and content foundations for curriculum development. Washington, American Industrial Arts Association. 18 p. (Educational Resources Information Center no. ED 020 429).
- Ettel, Kenneth A. 1966. Identification of major tasks performed by merchandising employees working in three standard industrial classifications. Moscow, Idaho University. 117 p. (Educational Resources Information Center no. ED 101 657) (Microfiche)

- Fruchter, Benjamin A. 1954. *Introduction to factor analysis*. New York, Van Nostrand. 280 p.
- Gage, N. L. (ed.). 1963. *Handbook of research on teaching*. Chicago, Rand McNally. 1218 p.
- Gagné, R.M. 1962. The acquisition of knowledge. *Psychological Review* 69:355-365.
- Glass, Gene V. and Julian C. Stanley. 1970. *Statistical methods in education and psychology*. New Jersey, Prentice Hall. p.33-38;59.
- Good, Carter V. and Douglas F. Scates. 1954. *Methods of research: Educational, Psychological, Sociological*. New York, Appleton. Chpts. 5 and 6.
- Goodlad, John I. 1966. *The development of a conceptual system for dealing with the problems of curriculum and instruction*. Los Angeles, University of California. 76 p. (Educational Resources Information Center no. ED 101 064) (Microfiche)
- Gunderson, Orley D. 1971. *A study of the common professional education requirements of community college vocational instructors of trade and industrial education*. Ed.D. thesis. Corvallis, Oregon State University. 96 numb. leaves.
- Halfin, Harold H. and E. Wayne Courtney. 1970. *The identification of the common professional training requirements of vocational education teachers*. Madison, Board of Regents of Wisconsin State Universities. 33 p.
- Harman, Harry H. 1967. *Modern factor analysis*. Rev. ed. Chicago, University of Chicago Press. p. 1-10; Chpt. 14.
- Harmon, Paul. 1969. A classification of performance objectives behaviors in job training programs. *Educational Technology* 9:5-12.
- Kirchner, Wayne K. and June A. Lucas. 1970. Using factor analysis to explore employee activities. *Personnel Journal* 49:492-494.
- Kirsner, Donald A. 1968. *A cognitive taxonomy of objectives for teacher education in educational psychology*. Ed.D. thesis. Los Angeles, University of Southern California. 537 numb. leaves.
- Krethwohl, David R. 1965. Stating objectives appropriately for program, for curriculum, and instructional materials development. *Journal of Teacher Education* 26:83-92.
- Lindahl, Donald G. 1971. *Commonalities in the professional education competencies in selected community college vocational instructors*. Ed.D. thesis. Corvallis, Oregon State University. 95 numb. leaves.
- Mager, Robert F. 1962. *Preparing instructional objectives*. Palo Alto, Pearson. 60 p.

- Mager, Robert F. and Kenneth M. Beach, Jr. 1967. Developing vocational instruction. Palo Alto, Fenlon, 63 p.
- Miller, Jack D. 1971. The common professional education competencies of selected community college vocational instructors. Ed.D. thesis. Corvallis, Oregon State University. 98 numb. leaves.
- Oregon State University, Division of Vocational, Adult, and Community College Education. 1971. Proposal for Change. Corvallis. p. 24
- Palmer, George J., Jr. and Ernest J. "Ferrick. 1961. A factor analysis of job activities. Journal of Applied Psychology 45:289-294.
- Sedgwick Harry E. 1966. Teacher's aide: A guide to curriculum development for the vocational instructor. Menomonie, Stout State University. 17 p. (Contract U-2-010-5-65-060, U.S. Office of Health, Education and Welfare. Educational Resources Information Center no. ED 024 761) (Microfiche)
- Siegel, Sidney. 1956. Nonparametric statistics for the behavioral sciences. New York, McGraw Hill. v. 23-26; III-115.
- Sjorgen, Douglas et al. 1967. The identification of common behavioral factors as a basis for pre-employment preparation of workers for gainful employment. Lincoln, University of Nebraska. 146 p. Final Report Number PR-5-1149. (Educational Resources Information Center no. ED 019 471) (Microfiche)
- Smith, Franklin R. and Jerome Moss Jr. (edit. re). 1970. Process and techniques of vocational curriculum development. Report of a seminar. Minneapolis, University of Minnesota. 125 p.
- Spartan, Richard L. 1972. The application of Bloom's Taxonomy to professional education competencies of selected vocational instructors. Ed.D. thesis. Corvallis, Oregon State University. 118 numb. leaves.
- Thurstone, Louis L. 1947. Multiple factor analysis. Chicago, The University of Chicago Press. 53 p.
- Tuckman, Bruce W. 1968. Structural analysis as an aid to curriculum development. New Brunswick, Rutgers University. 20 p. Incidental Report no. 1. U.S. Office of Education Number ED-8-0334. (Educational Resources Information Center no. 022-110) (Microfiche)
1970. A study of curriculum for occupational preparation and education (SOOP) Part I. Progress Reports 1 and II. New Brunswick, Rutgers University. 1 p. Office of Education Project Number ED-8-0334. (Educational Resources Information Center no. 10 927 37) (Microfiche)
- Tyler, Ralph W. 1950. Basic principles of curriculum and instruction. Chicago, The University of Chicago. 83 p.

4/42

- Tyler, Ralph W. 1966. New dimensions in curriculum development. Phi Delta Kappan XLVIII:25-28.
- Tyler, Ralph W., Robert M. Gagné, and Michael Scriven. 1967. Perspectives of curriculum evaluation. Chicago, Rand McNally. 102 p.
- U.S. Office of Education. 1968. General report of the advisory council on vocational education: The bridge between man and his work. 120 p. Washington, D.C.
- Yagi, Kan et al. 1968. The design and valuation of vocational education curricula through functional job analysis. Washington, D.C.: George Washington University. 95 p. Final report of Grant Number OEG-2-6-061659-2083, U.S. Office of Education. (Educational Resources Information Center no. ED123 913) (Microfiche)

A P P E N D I X

44 45

APPENDIX A

Name _____

Community College _____

Secondary School _____

INSTRUCTOR QUESTIONNAIRE

The Professional Education Competencies of Selected Community College and Secondary School Instructors

Purpose of Questionnaire: The purpose of this questionnaire is to seek your assistance in providing information which will be useful in the development of curriculum for colleges and universities seeking to offer relevant teacher education courses and programs for community college and secondary school vocational education instructors.

INSTRUCTIONS FOR COMPLETION OF THE QUESTIONNAIRE

A. In the spaces provided below, check (x) the appropriate subject matter area in which you teach the majority of your courses

- Agriculture (Forestry, Horticulture, Production)
- Business and Office
- Distributive (mid-management and marketing)
- Health Occupations
- Home Economics
- Trade and Industrial
- Service Occupation
- Technical
- Other (specify) _____

- B. This questionnaire contains professional education competencies for community college and secondary school instructors. In relation to your job, you are asked to indicate your best judgement about the hierarchical level you consider NECESSARY for each competency.
- C. Do not take too much time in thinking about any particular item. Please do not leave out any item--there are no right or wrong answers. We are primarily concerned about your judgment regarding the level of competencies needed by vocational education instructors.
- D. For each item please circle the rating (1, 2, 3, 4, 5, 6) which most closely represents YOUR JUDGMENT. If your judgment is not precisely represented by one of the choices, pick the one which comes closest. DO NOT LEAVE ANY BLANKS.

Here is an example:

Please read the fold-out before attempting to answer the question below.

Based on your teaching experience, what hierarchical level do you consider NECESSARY in your work as an instructor to:

- I. develop objective tests to measure achievement

knowledge comprehension application analysis synthesis evaluation	1 2 3 4 5 (6)
--	---------------

This person, in marking the "6" rating, considered that his job required complete mastery of this activity.

INSTRUCTIONS: When answering the questions, if any doubt should arise regarding the interpretation of a definition, please direct your comment to the interviewer. He is with you for just that purpose.

REMEMBER: This is not a test. Refer frequently to the definitions on the Green fold-out.

PROFESSIONAL EDUCATION COMPETENCIES QUESTIONNAIRE

Based on your teaching experience, what hierarchical level do you consider NECESSARY in your work as an instructor to:

	knowledge comprehension application analysis synthesis evaluation
1. assist (com col/sec sch) administrators initiate and maintain vocational programs	1 2 3 4 5 6
2. Interpret the provisions of instructor tenure laws	1 2 3 4 5 6
3. conduct a shop or laboratory demonstration for an individual student	1 2 3 4 5 6
4. involve yourself in civic community activities not directly related to the school	1 2 3 4 5 6
5. promote and teach adult vocational programs	1 2 3 4 5 6
6. ask questions during classroom presentations or demonstrations to aid student learning	1 2 3 4 5 6
7. adapt your appearance and apparel to acceptable standards for instructors	1 2 3 4 5 6
8. Interpret the innovative provisions of the Vocational Act as amended in 1968	1 2 3 4 5 6
9. select appropriate equipment and supplies for instructional purposes	1 2 3 4 5 6
10. arrange and conduct field trips	1 2 3 4 5 6
11. Interpret the goals and objectives of vocational education	1 2 3 4 5 6
12. Interpret the goals of general education	1 2 3 4 5 6
13. provide practical shop or laboratory experiences to enhance classroom learning	1 2 3 4 5 6
14. participate in the supervision of non-vocational extracurricular activities	1 2 3 4 5 6
15. aid the student in obtaining job placement after training	1 2 3 4 5 6
16. interpret the history of vocational education	1 2 3 4 5 6
17. relate technological advances to laboratory and classroom instruction	1 2 3 4 5 6

Based on your teaching experience, what hierarchical level do you consider NECESSARY in your work as an instructor to:

	knowledge	comprehension	application	analysis	synthesis	evaluation
	1	2	3	4	5	6
18. interpret state certification requirements for instructors	1	2	3	4	5	6
19. assist in the development of the total (community college/secondary school) program	1	2	3	4	5	6
20. prepare budgetary requests for vocational programs	1	2	3	4	5	6
21. locate available standardized tests	1	2	3	4	5	6
22. secure on-the-job training positions for students	1	2	3	4	5	6
23. interpret the state specifications and requirements for vocational facilities	1	2	3	4	5	6
24. develop audio-visual materials for instructional purposes	1	2	3	4	5	6
25. interpret the philosophy of the comprehensive (community college/secondary school)	1	2	3	4	5	6
26. select appropriate audio-visual materials for instructional purposes	1	2	3	4	5	6
27. revise courses in accordance with current occupational trends	1	2	3	4	5	6
28. maintain student performance or progress records	1	2	3	4	5	6
29. adhere to the code of ethics adopted in your (community college/secondary school)	1	2	3	4	5	6
30. Interpret the philosophy of the (com col/sec sch) in providing vocational programs for the student	1	2	3	4	5	6
31. select textbooks and instructional materials for the classroom, shop or laboratory	1	2	3	4	5	6
32. develop objective tests to measure achievement	1	2	3	4	5	6
33. motivate students in the classroom, shop or laboratory	1	2	3	4	5	6
34. interpret the legal liabilities of a teacher	1	2	3	4	5	6
35. direct, advise, or promote student participation in competitive events or youth organizations related to vocational education	1	2	3	4	5	6

Based on your teaching experience, what hierarchical level do you consider NECESSARY in your work as an instructor to:

	Knowledge Comprehension Application Analysis Synthesis Evaluation
36. relate to students from different socio-economic backgrounds	1 2 3 4 5 6
37. utilize individualized instruction materials and techniques	1 2 3 4 5 6
38. relate the course of study to measurable performance objectives	1 2 3 4 5 6
39. interpret your vocational program to others	1 2 3 4 5 6
40. provide special training or assistance to disadvantaged and handicapped students	1 2 3 4 5 6
41. use the State Plan for Vocational Education in securing reimbursement for vocational programs	1 2 3 4 5 6
42. organize or work with local vocational advisory committee	1 2 3 4 5 6
43. interpret the history of education	1 2 3 4 5 6
44. build a display for instructional purposes	1 2 3 4 5 6
45. formulate your own educational philosophy	1 2 3 4 5 6
46. utilize state guidelines for curriculum planning	1 2 3 4 5 6
47. draw from personal avocational interests to enrich instruction	1 2 3 4 5 6
48. identify the similarities and differences between the goals of general and vocational education	1 2 3 4 5 6
49. develop classroom instruction based upon the individual needs of the learner	1 2 3 4 5 6
50. provide appropriate practice for development of basic skills	1 2 3 4 5 6
51. relate the vocational program to other instructional programs	1 2 3 4 5 6
52. interpret the objectives of vocational education to others	1 2 3 4 5 6
53. break down an occupation or job into its component parts for instructional or guidance purposes	1 2 3 4 5 6
54. write performance objectives	1 2 3 4 5 6

Based on your teaching experience, what hierarchical level do you consider NECESSARY in your work as an instructor to:

- | 55. conduct community surveys to improve instruction or plan programs | 1 2 3 4 5 6 |
|---|-------------|
| 56. use the information contained in professional journals for personal improvement or improvement of instruction | 1 2 3 4 5 6 |
| 57. assess the validity, reliability and difficulty of instructor-made tests | 1 2 3 4 5 6 |
| 58. maintain a clean, orderly laboratory or classroom | 1 2 3 4 5 6 |
| 59. teach at the student's level and rate of learning | 1 2 3 4 5 6 |
| 60. utilize written shop, classroom, and laboratory equipment organizational plans | 1 2 3 4 5 6 |
| 61. maintain student attention during classroom presentations or demonstrations | 1 2 3 4 5 6 |
| 62. make a daily lesson plan | 1 2 3 4 5 6 |
| 63. distinguish between two or more educational philosophies | 1 2 3 4 5 6 |
| 64. maintain necessary report forms required by state or federal agencies | 1 2 3 4 5 6 |
| 65. use a student-centered teaching style | 1 2 3 4 5 6 |
| 66. identify students in need of counseling or guidance | 1 2 3 4 5 6 |
| 67. participate in professional organizations related to your subject matter area | 1 2 3 4 5 6 |
| 68. evaluate the effectiveness of a classroom or laboratory demonstration | 1 2 3 4 5 6 |
| 69. use the results of standardized test scores for job placement | 1 2 3 4 5 6 |
| 70. utilize the services of local and state vocational education agencies | 1 2 3 4 5 6 |
| 71. use counseling techniques to help students solve personal and social problems | 1 2 3 4 5 6 |

knowledge
 comprehension
 application
 analysis
 synthesis
 evaluation

Based on your teaching experience, what hierarchical level do you consider NECESSARY in your work as an instructor to:

	knowledge comprehension application analysis synthesis evaluation
72. summarize classroom presentations	1 2 3 4 5 6
73. aid students in entering educational or occupational training programs beyond the (com col/sec sch) level	1 2 3 4 5 6
74. develop performance tests to measure achievement	1 2 3 4 5 6
75. maintain discipline in the classroom, shop or laboratory	1 2 3 4 5 6
76. participate in outside trade, business, or professional organizations related to your subject matter area	1 2 3 4 5 6
77. lead a conference	1 2 3 4 5 6
78. develop student learning activities to facilitate instruction	1 2 3 4 5 6
79. communicate your ideas or point of view to other instructors or administrators	1 2 3 4 5 6
80. develop <u>subjective</u> tests to measure achievement	1 2 3 4 5 6
81. relate current events associated with your subject matter area to classroom instruction	1 2 3 4 5 6
82. Inform students of the nature and requirements of specific occupations	1 2 3 4 5 6
83. interpret the socio-economic class structure of the local community in relation to students enrolled in vocational programs	1 2 3 4 5 6
84. identify acceptable community social behaviors for instructors	1 2 3 4 5 6
85. work cooperatively with people in the community	1 2 3 4 5 6
86. identify local community power structures and pressure groups	1 2 3 4 5 6
87. operate duplicating equipment	1 2 3 4 5 6
88. make use of available guidance and counseling services within the (community college/secondary school)	1 2 3 4 5 6

Based on your teaching experience, what hierarchical level do you consider NECESSARY in your work as an instructor to:

	<i>Knowledge</i>	<i>Comprehension</i>	<i>Application</i>	<i>Analysis</i>	<i>Synthesis</i>	<i>Evaluation</i>
89. interpret school policies	1	2	3	4	5	6
90. provide programs for the student with special needs	1	2	3	4	5	6
91. use programmed learning materials	1	2	3	4	5	6
92. write articles for news releases	1	2	3	4	5	6
93. be stimulating in your work as an instructor	1	2	3	4	5	6
94. conduct follow-up studies for purposes of determining effectiveness of instruction	1	2	3	4	5	6
95. evaluate teaching effectiveness by measuring student achievement	1	2	3	4	5	6
96. articulate your instructional program with other educational institutions or agencies	1	2	3	4	5	6
97. interpret safety rules and regulations to students	1	2	3	4	5	6
98. screen and select students for your program	1	2	3	4	5	6
99. coordinate and supervise cooperative work experience programs	1	2	3	4	5	6

- - - - -

APPENDIX B
Results of Chi-square Analysis Using the Median Test^a

Competency number	Computed value	Null Hypothesis	Competency number	Computed value	Null Hypothesis
1	.017	Retain	27	.000	Retain
2	.044	"	28	.006	"
3	.045	"	29	1.054	"
4	.019	"	30	.039	"
5	.000	"	31	1.223	"
6	.000	"	32	.046	"
7	.618	"	33	.087	"
8	.083	"	34	.000	"
9	2.478	"	35	1.061	"
10	.048	"	36	1.800	"
11	3.450	"	37	.071	"
12	.024	"	38	.000	"
13	.000	"	39	1.087	"
14	2.759	"	40	.039	"
15	4.253	Reject	41	.015	"
16	2.311	Retain	42	.090	"
17	.077	"	43	.000	"
18	.000	"	44	.019	"
19	4.286	Reject	45	.044	"
20	1.557	Retain	46	.090	"
21	.917	"	47	.032	"
22	1.076	"	48	.017	"
23	2.795	"	49	.018	"
24	.530	"	50	1.089	"
25	.120	"	51	.006	"
26	.059	"	52	1.513	"

Competency number	Computed value	Null hypothesis	Competency number	Computed value	Null hypothesis
53	.043	Retain	81	1.151	Retain
54	.019	"	82	1.087	"
55	.000	"	83	1.004	"
56	2.108	"	84	.000	"
57	.042	"	85	1.038	"
58	.017	"	86	.000	"
59	.048	"	87	.000	"
60	.000	"	88	.000	"
61	.019	"	89	.017	"
62	.000	"	90	.000	"
63	.017	"	91	.070	"
64	.000	"	92	1.400	"
65	1.543	"	93	2.132	"
66	1.719	"	94	.017	"
67	2.197	"	95	.068	"
68	1.820	"	96	1.068	"
69	1.125	"	97	.043	"
70	.000	"	98	.000	"
71	.000	"	99	.0713	"
72	.000	"			
73	.000	"			
74	.000	"			
75	.022	"			
76	2.738	"			
77	1.064	"			
78	.038	"			
79	.037	"			
80	1.557	"			

* The significance level for testing the null hypothesis was set at .05 with the degrees of freedom equal to 1.

** The data being hierarchical in nature precludes the application of additional statistical tests.

APPENDIX C

Coding of Data Cards

A) Card 1Column

- 1-3 A03 to A04. Represents one of the 94 instructors used in the study.
- 4-5 1 to 25 represents one of the community colleges or secondary schools.
- 6 1 to 8. Represents one of the eight subject matter areas in which the respondents taught.
- 7 1. Data card number one.
- 8-80 Data. Response values of 1,2,3,4,5, and 6 which were assigned to the 73 competencies contained in the card.

B) Card 2Column

- 1-7 Same as above.
- 8 2. Data card number two.
- 9-26 Data. Response values of 1,2,3,4,5, and 6 which were assigned to the 26 competencies contained in the card.

APPENDIX D

Q-Mode Data Control Cards

8 JOB, 70E090,SPAZ, DICK SPAZIANI
8TIME=1000
8WFBLK5=500
8COPY, 0-80
8GO
8DATA,TRANS,CARDS=2,ITEMS=99.
8CORR,QMODE,01AG=ONE,OUTPUT.
8FACTOR,NUMFAC=4,EIGEN,OUTPUT.
8ROTATE,VARI,NONSTD,OUTPUT.
8TITLE BLOOM'S TAXONOMY
8LABEL,A01\$A02\$A03\$A18\$
A19\$A38\$
A39\$A58\$
A59\$A78\$
A79\$A94\$.
8FORMAT (7X,73F1.0, 7X,26F1.0)
8END
Data cards inserted here
88
8REWIND,80
8FAST
8LOGOFF

APPENDIX E

R-Mode Data Control Cards

```
7 JOB, 703000,SFAZ, DIC, SPAZIANI
@TIME=1000
@NFBLK5=500
@COPY, 0:80
@GO
@DATA,CARDS=2,ITEMS=99.
@CORR,RMODE,DIAG=ONE,PRINTCUT=BOTH,OUTPUT.
@FACTOR,NUMFAC=5 EIGEN,OUTPUT.
@ROTATE,VARI,NONSTD,OUTPUT.
@TITLE BLOOM'S TAXONOMY
@LABEL,$01$$02$$03$ .....$1E$ 
$1$ .....$1E$ 
$3$ .....$1E$ 
$5$ .....$1E$ 
$7$ .....$1E$ 
$9$ .....
```

```
@FORMAT(7X,73F1.0, 7X,26F1.0)
```

```
@END
```

```
Data cards inserted here
```

```
@@
```

```
@@
```

```
BREWIND,80
```

```
@FAST
```

```
@LOGOFF
```

APPENDIX F

Results of Q-Mode Analysis

Respondent number	Factor loading	Respondent number	Factor loading	Respondent number	Factor loading
01	.967	33	.944	65	.940
02	.965	34	.947	66	.949
03	.920	35	.961	67	.958
04	.962	36	.938	68	.926
05	.979	37	.943	69	.961
06	.958	38	.976	70	.961
07	.978	39	.951	71	.943
08	.973	40	.950	72	.952
09	.955	41	.949	73	.940
10	.932	42	.961	74	.956
11	.961	43	.968	75	.971
12	.956	44	.949	76	.915
13	.926	45	.972	77	.919
14	.941	46	.960	78	.924
15	.954	47	.961	79	.950
16	.940	48	.928	80	.920
17	.982	49	.943	81	.926
18	.952	50	.963	82	.932
19	.940	51	.958	83	.952
20	.965	52	.962	84	.951
21	.920	53	.951	85	.952
22	.951	54	.960	86	.962
23	.951	55	.942	87	.950
24	.965	56	.931	88	.952
25	.953	57	.943	89	.952
26	.938	58	.972	90	.964
27	.939	59	.971	91	.946
28	.923	60	.953	92	.935
29	.917	61	.964	93	.932
30	.962	62	.958	94	.973
31	.944	63	.966		
32	.925	64	.954		

APPENDIX G

**Oregon Community Colleges
Participating in the Study**

- | | |
|--|--|
| 1. Blue Mountain Community College
2411 Carden Avenue N.W.
Pendleton, Oregon 97801 | 7. Linn-Benton Community College
Box 249
Albany, Oregon 97321 |
| 2. Central Oregon Community College
College Way
Bend, Oregon 97701 | 8. Mt. Hood Community College
26000 SE Stark
Gresham, Oregon 97030 |
| 3. Chemeketa Community College
4339 Satter Drive N.E.
Salem, Oregon 97303 | 9. Portland Community College
12000 S.W. 49th Avenue
Portland, Oregon 97219 |
| 4. Clackamas Community College
19800 S. Molalla Avenue
Oregon City, Oregon 97045 | 10. Southwestern Community College
Coos Bay, Oregon 97420 |
| 5. Clatsop Community College
16th and Jerome
Astoria, Oregon 97105 | 11. Treasure Valley Community
College
650 College Boulevard
Ontario, Oregon 97914 |
| 6. Lane Community College
4000 East 30th Avenue
Eugene, Oregon 97405 | 12. Umpqua Community College
Box 967
Roseburg, Oregon 97470 |

APPENDIX H

**Oregon Secondary Schools
Participating in the Study**

- | | |
|---|--|
| 13. Astoria Senior High School
1001 W. Marine Drive
Astoria, Oregon 97103 | 20. Newport High School
322 N.E. Eads
Newport, Oregon 97365 |
| 14. Clackamas High School
13801 S.E. Webster Rd.
Milwaukie, Oregon 97222 | 21. Ontario High School
1115 W. Idaho Avenue
Ontario, Oregon 97914 |
| 15. Estacada Union High School
350 N.W. 7th
Estacada, Oregon 97023 | 22. Riddle High School
Riddle, Oregon 97469 |
| 16. Forest Grove High School
1341 Pacific Ave.
Forest Grove, Oregon 97116 | 23. McNary High School
505 Sandy Drive, N
Salem, Oregon 97303 |
| 17. Gervais High School
Gervais, Oregon 97026 | 24. Springfield High School
Springfield, Oregon 97477 |
| 18. Hood River Valley High School
Rt. 4, Box 270
Hood River, Oregon 97331 | 25. Cascade Union High School
Rt. 1
Turner, Oregon 97329 |
| 19. Junction City High School
1135 West 6th
Junction City, Oregon 97448 | |